

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Appellants: Marc Scott Hodes, *et al.*

Serial No.: 10/674,448

Filed: September 30, 2003

Title: METHOD AND APPARATUS FOR CONTROLLING THE FLOW RESISTANCE  
OF A FLUID ON NANOSTRUCTURED OR MICROSTRUCTURED SURFACES

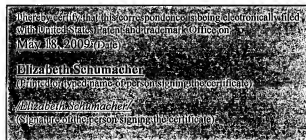
Grp./A.U.: 1797

Examiner: Jyoti Nagpaul

Confirmation No.: 4121

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

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ATTENTION: Board of Patent Appeals and Interferences

Sirs:

**APPEAL BRIEF UNDER 37 C.F.R. §41.37**

This is an appeal from a Final Rejection dated February 22, 2008, of Claims 1-6 and 12-13 and additional rejection of the claims in an Office Action dated January 28, 2009. The Appellants submit this Brief with the statutory fee of a large entity as set forth in 37 C.F.R. §41.20(b)(2), and hereby authorize the Commissioner to charge any additional fees connected with this communication or credit any overpayment to Deposit Account No. 08-2395.

This Brief contains these items under the following headings, and in the order set forth below in accordance with 37 C.F.R. §41.37(c)(1):

- I. REAL PARTY IN INTEREST
- II. RELATED APPEALS AND INTERFERENCES
- III. STATUS OF CLAIMS
- IV. STATUS OF AMENDMENTS
- V. SUMMARY OF CLAIMED SUBJECT MATTER
- VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL
- VII. APPELLANTS' ARGUMENTS
- VIII. APPENDIX A - CLAIMS
- IX. APPENDIX B - EVIDENCE
- X. RELATED PROCEEDINGS APPENDIX

### I. REAL PARTY IN INTEREST

The real party in interest in this appeal is the Assignee, Lucent Technologies Inc.

### II. RELATED APPEALS AND INTERFERENCES

No other appeals or interferences will directly affect, be directly affected by, or have a bearing on the Board's decision in this appeal.

### III. STATUS OF THE CLAIMS

Claims 1-6 and 12-13 are pending in this application. Claims 7-11 are canceled. Claims 1-6 are rejected under 35 U.S.C. §102(b). Claims 12-13 are rejected under 35 U.S.C. §103(a). Each of the pending claims are being appealed.

### IV. STATUS OF THE AMENDMENTS

The Examiner issued a Final Rejection on February 22, 2008. On the same day that a previous appeal brief was filed (Nov. 17, 2008) an amendment under 37 CFR 41.33(b)(2) was made to rewrite Claim 5 in independent form. No other amendments to the claims have been made subsequent to the Examiner's Final Rejection.

### V. SUMMARY OF CLAIMED SUBJECT MATTER

Various embodiments are directed, in general, to an apparatus for controlling the flow resistance of a fluid (Title). Example embodiments of the apparatus are illustrated in FIG. 7A-7B, FIG. 8A-8C, and FIG. 11B, reproduced below (illustrations 1, 2, and 3, respectively). The apparatus comprises a substrate 805 (P.9, L. 8) having at least a first surface, and, a plurality of closed cells 701 (P.8, L.18) disposed in a predetermined feature pattern 804 (P.9, L. 8) on the at least a first surface. The apparatus also comprises a means for changing the pressure (P.3, L.15-23) of at least a first fluid

disposed within the plurality of closed cells in order to cause a selected liquid 801 (P.8, L.23) to change the degree of penetration of the feature pattern (e.g., compare FIGS. 8a, 8B and 8C; P.8, L.21 to P.11, L.1; P.11, L.18 to P.14, L.7).

FIG. 7 A

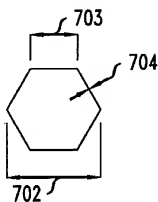


FIG. 7 B

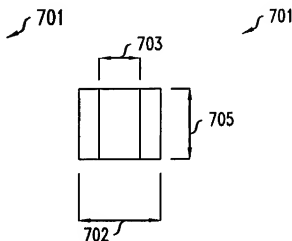


Illustration 1

FIG. 8 A

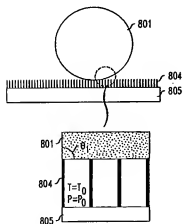


FIG. 8 B

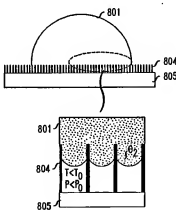


FIG. 8 C

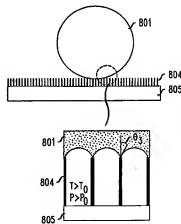


Illustration 2

The term closed cell is defined as a cell that is enclosed on all sides except for the side upon which a liquid is or could be disposed (P.8, L.1-13). The term fluid encompasses both gases (such as, illustratively, air) and liquids that could be disposed within the cells of the feature pattern (P.8, L.29-31).

By changing the pressure within the individual cells, such as cell 701 (illustration 1), the liquid droplet 801 (illustration 2) can be either drawn into the cells or, alternatively, repelled out of the cell (P.8, L.31-33). FIG. 11B (illustration 3) depicts an example fluid (air) having pressure  $P_1$  within an example feature pattern 1103, and, an example liquid 1102 (water) having pressure  $P_2$  disposed on the feature pattern 1103 (P.11, L.31 to P.12, L.8).

FIG. 11B

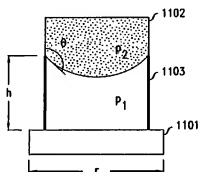


Illustration 3

The means for changing the pressure of at least a first fluid can comprise a means for injecting and removing varying amounts of the fluid into and out of said cells, respectively (P.15, L.16-18).

## VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. The first issue presented for consideration in this appeal is whether the objections to Claims 1 and 5 are proper. In the Office Action dated January 28, 2009, the Examiner objects to and requires correction to informalities in these claims on the grounds that, “it appears applicants intend to claim the same fluid,” when reciting a “first fluid” and “selected fluid,” in these claims.

2. The second issue presented for consideration in this appeal is whether Claims 1-6, as rejected by the Examiner, in the Office Action dated January 28, 2009, are anticipated in accordance with 35 U.S.C. §102(a) by U.S. Patent No. 4,750,693 to Lobert et al. (“Lobert”).

3. The third issue presented for consideration in this appeal is whether Claims 12-13, as rejected by the Examiner, in the Office Action dated January 28, 2009, under 35 U.S.C. §103(a) are made obvious from Lobert.

## VII. APPELLANTS' ARGUMENT

For the reasons set forth below, proper grounds for objecting to Claims 1 and 5 have not been established, and, the invention recited in Claims 1-6 and 12-13 are not anticipated nor made obvious by the art applied by the Examiner.

### 1. Grounds for objecting to Claims 1 and 5 have not been established

The Appellant wish to note for the record that the terms, “first fluid” and “selected liquid,” appeared in the original language of Claim 1 in the application filed September 30, 2003. Through two previous office actions, and two re-openings of prosecution on new grounds, from April 30, 2007 to June 27, 2008 the Examiner did not see the need to raise this objection, until a third re-openings of prosecution on new grounds on January 28, 2009. Therefore, these grounds for

objection could have been raised in any number of these several previous office actions filed in this case.

The Appellants submit that the grounds for objecting to Claims 1 and 5 are improper because, contrary to the Examiner's assertion, the Appellants did not intend the fluid and liquid recited in Claims 1 and 5 to refer to the same material. Nor is it apparent why one of ordinary skill in the art, after reading the claims and specification, would come to this conclusion.

First, if the Appellants had intended that the liquid and fluid recited in these claims to refer to the same material, they would have used the same terms with the appropriate language to indicate an antecedent basis.

Second, the specification makes clear that the liquid and fluid do not refer to the same materials. For instance, the specification states:

the term closed cell is defined as a cell that is enclosed on all sides except for the side upon which a liquid is or could be disposed. (emphasis added, Page 8, Lines 11-13)

the term fluid is intended to encompass both gases (such as, illustratively, air) and liquids that could be disposed within the cells of the feature pattern (emphasis added, Page 8, Lines 29-31)

by changing the pressure within the individual cells, such as cell 701, the liquid droplet 801 can be either drawn into the cells or, alternatively, repelled out of the cell (Page 8, Lines 31-33)

Additional, as noted in section V above, FIG. 11B (illustration 3) depicts an example fluid (air) having pressure P1 within an example feature pattern 1103 and an example liquid 1102 (water) having pressure P2 disposed on the feature pattern 1103.

Based on these disclosures, the Appellants submit that one of ordinary skill in the art would not confuse the liquid and fluid recited in Claims 1 and 5 as being the same material. The fact that the Examiner never raised this objection even though having several previous opportunities to do so,

suggests that there was no misunderstanding by the Examiner that the liquid and fluid recited in the claims referred to different materials.

Therefore, as proper grounds to support the Examiner's objection to Claims 1 and 5 have not been established, the Appellants respectfully request the Board to withdraw the objections.

2. The Office Action does not establish that Lobert anticipates Claims 1-6

The Appellants submit that the Office Action has not established grounds for Lobert to anticipate each and every element of independent Claims 1 and 5.

The Appellants submit that the Examiner has not established grounds for Lobert to teach each and every element of independent Claims 1 or 5. The Appellants present three independent reasons in support of their position that anticipation has not been established:

A) Second independent reason

Claim 1 recites, "a substrate having at least a first surface; and a plurality of closed cells disposed in a predetermined feature pattern on said at least a first surface."

Similar language is recited in Claim 5.

The Examiner asserts that Lobert's grooves 10 teach a plurality of closed cells as recited in Claims 1 and 5 (Detailed Action, Page 3, Lines 16-17).

The Appellants submit that the Examiner has not provided evidence that Lobert teaches the closed cells as recited in Claims 1 and 5.

As indicated above, a closed cell is defined as a cell that is enclosed on all sides except for the side upon which a liquid is or could be disposed (Detailed description, Page 8, Lines 11-13).

The Examiner has not presented evidence, however, showing that Lobert's grooves form



closed cells.

For instance, Lobert describes his surface microstructures 10, 10a as transverse grooves with a sawtooth profile (C.2, L.35-36) either having or not having sub-grooves 11 (C.5, L.10-12). Lobert also describes calculating the flow properties of such structures modeled as a "triangular profile with a vertical flank" or "an inclined ramp" (C.4, L.21-21). Lobert's figures (see e.g., FIG. 4a-5b, illustration 4) show cross-sections of microstructures 10 with a saw-tooth shaped profiles:

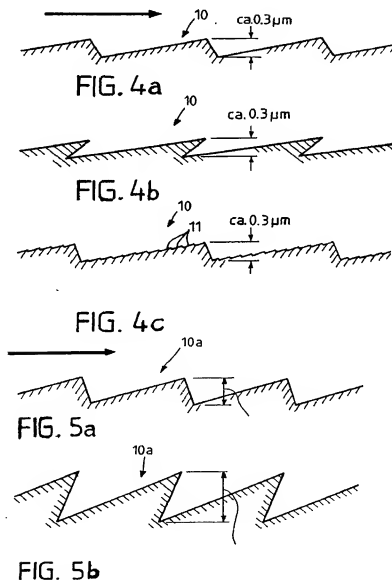


Illustration 4

It is not apparent to the Appellants why, based on this disclosure, one of ordinary skill in the art would construe Lobert's transverse grooves as teaching the closed cells recited in Claims 1 and 5. To the contrary, terms such as "transverse grooves," "inclined ramp," and "saw-tooth profile," imply that Lobert's structures are open-ended structures that extend in a direction transverse to a flow direction indicated by the arrow (e.g., orthogonal to the page) in Lobert's figures.

B) Second independent reason

Claim 1, among other things, recites, "means for changing the pressure of at least a first fluid disposed within said plurality of closed cells in order to cause a selected liquid to change the degree of penetration of said feature pattern."

Similar language is recited in Claim 5.

Referring to Claim 1, the Examiner also states, for the first time:

Lines 5-7 appear to be more appropriately drawn to a method step not germane to patentability in apparatus Claim 1. It does not appear that the "means for changing the pressure" structurally forms any part of the apparatus itself." (Detailed Action, Page 4, Lines 5-8).

The Appellants submit that under 35 U.S.C. § 112, paragraph six, The Examiner is required to construe the corresponding structure for the "means for changing the pressure," as recited in Claim 1 or 5. Section 112, paragraph six specifically states:

An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof. (emphasis added)

It is clear from the language of section 112, paragraph six, that it is not optional for the Examiner to simply ignore the above-recited elements of Claims 1 and 5, and therefore, the

Examiner must construe corresponding structures for the "means for changing the pressure."

The Office Action, however, has not shown that the relied upon art teaches such a structure.

C) Third independent reason

The Examiner asserts that Lobert's device inherently teaches, "changing the pressure of at least a first fluid disposed within said plurality of closed cells in order to cause a selected liquid to change the degree of penetration of said feature pattern," as recited in Claims 1 and 5, because:

it is inherent in Lobert's invention that a particular and chosen movement and direction of a moving body and taking into consideration appropriately selected parameters such as flow velocity, flow direction, drag factor, etc., that one can inherently can[sic] change the pressure of a first fluid disposed within the plurality of closed cells (10) in order to cause a selected liquid to change the degree of penetration of the feature pattern. (Detailed Action, Page 3, Line 20-Page 4, Line 2).

The Appellants disagree that the Office Action has established that Lobert discloses "a particular and chosen movement and direction" that would cause a change the pressure of a fluid in a closed cell that changes the degree of penetration of a liquid, such as recited in Claims 1 or 5.

For instance, the Examiner does not cite any portions of Lobert that discloses that a particular movement and direction of Lobert's device actually causes temperature or pressure changes in a fluid disposed in the grooves that the Examiner asserts to be closed cells. For instance, the Examiner has not presented any evidence that Lobert even considers a configuration of his airborne or waterborne device where a fluid is disposed within a groove, and a liquid changes its degree of penetration into the groove, as a function of "a particular and chosen movement and direction." Rather the fact that Lobert does not consider this, supports the Appellant's position that Lobert's structures are open-ended grooves or ramps that would not be capable of holding a fluid within.

Therefore, the Examiner's assertion appears to be conclusory statements with no rational

underpinning to support the asserted teaching by Lobert.

Accordingly, the Appellants respectfully request the Board to withdraw the §102(a) rejections with respect to Claim 1 and its dependent claims, and, to Claim 5.

3. The Office Action has not established that Lobert supports a *prima facie* case of obviousness Claims 12-13

For the reasons presented in Section 2, the Office Action does not show that Lobert teaches or all of the elements of Claim 1. Therefore Lobert also does not teach all of the elements of Claims 12-13 which are dependent on Claim 1. Moreover the Office Action has not presented grounds showing that Lobert suggests all of the elements of Claim 1.

In view of the foregoing remarks, the cited references as applied in the Office Action do not establish a *prima facie* case of obviousness to support the rejection of the above claim under 35 U.S.C. §103(a). The Appellants therefore respectfully request the Board to withdraw the rejection

## Conclusion

For the reasons set forth above, the Claims on appeal are not properly objected to, are not anticipated by Lobert and are patentably nonobvious over Lobert. Accordingly, the Appellants respectfully request that the Board of Patent Appeals and Interferences reverse the Examiner's Final Rejection of all of the Appellant's pending claims.

Respectfully submitted,

HITT GAINES, P.C.

A handwritten signature in black ink, appearing to read "Ronald J. Corbett", with a stylized flourish at the end.

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Dated: May 18, 2009

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VIII. APPENDIX A - CLAIMS

1. An apparatus comprising:  
a substrate having at least a first surface; and  
a plurality of closed cells disposed in a predetermined feature pattern on said at least a first surface,  
  
means for changing the pressure of at least a first fluid disposed within said plurality of closed cells in order to cause a selected liquid to change the degree of penetration of said feature pattern.
2. The apparatus of claim 1 wherein said plurality of closed cells each have at least a first dimension less than 1 millimeter.
3. The apparatus of claim 1 wherein said plurality of closed cells each have at least a first dimension less than 1 micron.
4. The apparatus of claim 1 wherein said means for changing the pressure of at least a first fluid comprises means for changing the temperature of said at least a first fluid.
5. An apparatus comprising:  
a substrate having at least a first surface; and  
a plurality of closed cells disposed in a predetermined feature pattern on said at least a first surface,  
  
means for changing the pressure of at least a first fluid disposed within said plurality of closed cells in order to cause a selected liquid to change the degree of penetration of said feature pattern, wherein said means for changing the pressure of at least a first fluid comprises means for

injecting and removing varying amounts of said fluid into and out of said cells, respectively.

6. The apparatus of claim 1 wherein the means for changing the pressure of at least a first fluid comprises a liquid disposed on said feature pattern in a way such that, upon the pressure of said liquid changing, the pressure of said fluid changes.

Claims 7-11 (canceled)

12. The apparatus of claim 1 wherein the closed cells have a width ranging from about 4 to 25 microns.

13. The apparatus of claim 1 wherein the closed cells have a height-to-width ratio ranging from about 0.12 to 0.18.

IX. APPENDIX B - EVIDENCE

None



X. RELATED PROCEEDINGS APPENDIX

None